Project Report: Causes of mass extinctions: testing impact models_Kring

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Project Progress

In the past year the University of Arizona module of the University of Washington–led Astrobiology node (1a) completed a petrological and provenance study of Triassic/Jurassic (T/J) boundary sediments from British Columbia, testing the impact–mass extinction hypothesis, (1b) provided splits for C–isotope analyses to determine the extent of productivity collapse and the possible role of other, non–impact processes; (2a) sampled a second suite of T/J boundary sediments from Nevada, (2b) began a petrological and provenance study of them, and (2c) provided splits for C–isotope analyses; (3) completed a study of the ignition threshold of impact–generated wildfires and demonstrated the T/J–era Manicouagan impact event could have produced continental–scale wildfires (this study augments the previous year's study of the effect of a continental–scale impact air–blast produced by the Manicouagan impact event); and (4) completed a study of impact–generated acid rain trauma following the Chicxulub impact event and its possible role in the Cretaceous/Tertiary (K/T) boundary mass extinction event.

Highlights

- The T/J boundary has been pin–pointed! Negative C–isotope excursions suggest the boundary is associated with a productivity collapse.
- C–isotope data at T/J boundary sections, however, also indicate the T/J transition was complex and may not have been the result of a single, traumatic blow to the biosphere.
- Chicxulub is the only known impact event in the Phanerozoic to have been large enough to create globally–distributed wildfires.
- Manicouagan and Popigai impact events were large enough to have created continental–scale wildfires.
- The Chicxulub–generated acid rain trauma was sufficient to acidify continental lakes and waterways if they were not buffered by carbonate catchements.

Roadmap Objectives

- ***Objective No. 4.3:*** Effects of extraterrestrial events upon the biosphere